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Pesticide Fact Sheet Number 41: Cyanazine

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16. Abstract (Limit: 200 words)

This document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticide or group of pesticides. A Fact Sheet is issued after one of the following actions has occurred.

1. Issuance or reissuance of a registration standard,
2. Issuance of each special review document,
3. Registration of a significantly changed use pattern,
4. Registration of a new chemical, or
5. An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.

17. Document Analysis a. Descriptors

Pesticides, regulations, Chemical Information Fact Sheet, Use Patterns, Science Findings

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

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(See ANSI-Z39.18) See Instructions on Reverse

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United States
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Office of Pesticides and Toxic Substances
Office of Pesticide Programs (TS-768C)
Washington, DC 20460

EPA

Pesticide Fact Sheet

Name of Chemical: CYANAZINE
Reason for Issuance:
Date Issued: Dec. 31,1984
Fact Sheet Number: 41

1. Description of chemical:

Generic Name: cyanazine
Common name: cyanazine (WSSA, BSI, ISO); SD 15418 and WL 19805 (code numbers)
Trade name: BLADEX® 80 WP or 80W, BLADEX® 4-WDS or 4L, BLADEX® 15G
EPA Shaughnessy Code: 100101
Chemical Abstracts Service (CAS) Number: 21725-46-2
Year of Initial Registration: 1971
Pesticide Type: Herbicide
Chemical family: Triazine
U.S. and Foreign Producers: Shell Chemicals (U.S.A.)

2. Use patterns and formulations:

Application sites: To control annual grasses and broadleaf weeds in corn, grain sorghum, cotton, and wheat fallow. Application for soybean use is pending.
Types of formulations: Wettable powder, flowable suspension, granular form.
Types and Methods of Application: Aerial and ground sprays, application through irrigation systems.

Application Rates:

Crop	Application Timing	lbs active ingredient (ai) per acre
Corn	Preemergence	1.25-4.75
	Postemergence	1.2-2.0

Usual carriers: Water or liquid fertilizers for preemergent use on corn. Water only on postemergence treatments, grain sorghum and cotton.

3. Science Findings:

Summary science statement: Cyanazine has been found in groundwater. It has potential to create teratogenic effects; this potential is being evaluated in the Special Review process. Acute toxicity ratings are generally low.

Chemical characteristics:

Physical state:	crystalline				
Color:	white				
Odor:	none				
Vapor pressure:	1.6×10^{-9} mm Hg at 20°C				
Melting point:	166.5 - 167° C				
Flammability:	non-flammable				
Octanol/water partition coefficient:	not available				
Stability:	Stable at pH values of 5, 7, and 9 for >30 days				
	Stable in sunlight, and at 75° for 100 hours				
Solubility:	Water (23°C)	- 160 ppm	Benzene (20°C)	-	1.5%
	Xylene	- <10%	Ethanol (20°C)	-	4.5%
	Chlorobenzene	- <10%	Chloroform	-	21.0%
	Methylcyclohexanone - 21.0%				

Unusual handling characteristics: None reported

Toxicological characteristics:

Acute Effects:

Acute Oral LD_{50} - 334 mg/kg (male rats), 156 mg/kg (female rats) (Category II)
Acute Dermal LD_{50} - >2000 mg/kg (rabbits) (Category III)
Acute Inhalation Toxicity - LC_{50} >2.28 mg/kg (Category III)
Primary Eye Irritation - Mild eye irritation (Category II)

Cotton	Preemergence	0.5-1.3
	Early postemergence directed	0.6-1.0
	Postemergence layby	0.8-1.6
Grain Sorghum	Preemergence	
	Tank mixed with propachlor	1.0-1.6
	Tank mixed with propazine	0.8-1.2

Major Routes of Exposure: Dermal, inhalation

Chronic Effects:

Oncogenicity - Results inconclusive.

Teratology - F-344 Rats: Increased incidence of anophthalmia and microphthalmia at 25 mg/kg/day, NOEL = 10 mg/kg/day. Increased incidence of diaphragmatic hernia in all treated groups. More data are required to ascertain the nature of this effect.

Sprague-Dawley rats: Slight decrease in maternal body weight at 30 mg/kg/day. NOEL = 3 mg/kg/day

Rabbits: Maternal toxicity and fetotoxicity at 2 mg/kg/day. NOEL = 1 mg/kg/day

Mutagenicity - data gap

Immunotoxicity - data gap

Physiological and Biochemical Behavioral Characteristics:

Translocation: When applied to soil, cyanazine is absorbed by the roots and translocated to the leaves.

Environmental Characteristics:

Absorption and leaching characteristics: Cyanazine is reversibly adsorbed to soil particles. The degree of adsorption varies with soil texture, water content, and organic matter content. Leaching rate into the soil was measured on a sandy loam soil and found to be comparable to that of atrazine.

Microbial breakdown: Cyanazine is degraded in the soil primarily by microbes.

Loss from photodegradation and/or volatilization: Under field conditions there is only a minimal loss of cyanazine by either photodecomposition or volatilization.

Resultant average persistance: Half-life about 2 weeks under conditions favorable for plant growth.

Half-life in Water: Unknown.

Ecological characteristics:

Hazards to Birds: Data are incomplete. Preliminary data show low toxicity, suggesting minimal hazards.

Hazards to Fish and Aquatic Invertebrates: Data are incomplete. Preliminary data show low toxicity, suggesting minimal hazards.

Potential Problems with Endangered Species: No hazards indicated.

Tolerance Reassessment:

List of crops and tolerances: (CFR 180.307)

COMMODITY	(PPM)
Corn, fodder	0.2
Corn, forage	0.2
Corn, fresh (Inc. sweet)(K+CWHR)	0.05
Corn, grain	0.05
Cotton, seed	0.05
Sorghum, forage	0.05
Sorghum, fodder	0.05
Sorghum, grain	0.05

Wheat, forage, green	0.1
Wheat, grain	0.1
Wheat, straw	0.1

List of food contact uses: Corn, cotton (oil), sorghum, wheat.
Results of tolerance assessment: No ADI can be set at this time

4. Summary of Regulatory Position and Rationale:

Use Classification: Reclassified (by the Registration Standard) as a Restricted Use chemical because of teratogenic effects, and because it is found in groundwater.

Use, Formulation or Geographic Restrictions: Manufacturing-use products may only be formulated into end-use products intended for use as an herbicide on corn, cotton, sorghum, or fallow land, or winter wheat.

Unique Label Warning Statements:

a) Use Classification Statements:

Labels of all formulated products must bear the following statements:

"RESTRICTED USE PESTICIDE: Because cyanazine can leach into groundwater, and has produced birth defects in laboratory animals, this product may be applied only by certified applicators or persons under their direct supervision."; and

"Cyanazine is a pesticide which can travel (seep or leach) through soil and can contaminate groundwater which may be used as drinking water. Cyanazine has been found in groundwater as a result of agricultural use. Users are advised not to apply cyanazine where the water table (ground water) is close to the surface and where the soils are very permeable, i.e. well drained soils such as loamy sands. Your local agricultural agencies can provide further information on the type of soil in your area and the location of ground water."

b) Precautionary Statements

Labels of manufacturing-use products and end-use products (EUPs) must bear the statements:

a. Hazards to Humans Statements

"WARNING: May be fatal if swallowed. Harmful if inhaled or absorbed through the skin. Causes substantial but temporary eye injury. Avoid breathing dust (vapor or spray mist). Avoid contact with skin, eyes or clothing. Do not get in eyes or on clothing. Wear a face shield. Wash thoroughly with soap and water after handling and before eating or smoking. Remove contaminated clothing and wash before reuse."; and

"Use of this product may be hazardous to your family's health. This product has been determined to cause birth defects in laboratory animals. Exposure of women of child-bearing age to cyanazine should be avoided."

c) Statements of Practical Treatment

"If on skin: Wash with plenty of soap and water. Get medical attention.

"If in eyes: Flush with plenty of water. Call a physician."

"If swallowed: Call a physician or Poison Control Center. Drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger. Do not induce vomiting or give anything by mouth to an unconscious person."

d) Environmental Hazard Statement

The following specific statements must appear on the labels of all manufacturing use products:

"Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or public waters unless this product is specifically identified and addressed in a NPDES permit. Do not discharge effluent containing this product to sewer systems without previously notifying the sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA."

The labels of EUPs intended for outdoor use must bear one of the following statements, depending on the formulation of the product:

Granular products must bear the statement:

"Do not apply directly to water or wetlands. In case of spills, collect for use or properly dispose of the granules. Do not contaminate water by cleaning of equipment or disposal of wastes."

Non-granular products must bear the statement:

"Do not apply directly to water or wetlands. Do not contaminate water by cleaning of equipment or disposal of wastes."

The label of all products (except those, if any, intended solely for household use) must bear the appropriate container disposal statement, as will be given in Appendix IV-5 of the guidance package.

The required statements listed in this standard must appear on the labels of all MUPs and EUPs released for shipment after June 30, 1985. After review of data to be submitted under this standard, the Agency may impose additional label requirements.

Summary of risk/benefit analysis: Cyanazine produces teratogenic effects in laboratory animals. Exposure to the public through the dietary route is not sufficiently large to exceed the risk criterion in 40 CFR 162.11. Margins of safety are adequate for that route. However, the dermal exposure rates of mixer/loaders and applicators are comparable to levels at which effects occur in experimental animals. This triggers the risk criterion in 40 CFR 162.11, sending cyanazine into the Special Review Process. The benefits of cyanazine are primarily from its effectiveness as an herbicide on corn, which accounts for 96% of total use. Available alternatives to cyanazine do not have as broad a spectrum of weed control. The most widely used alternative is atrazine, which may have more persistent residues and leaches through the ground at the same rate as cyanazine. On cotton (3% total use) the alternatives again do not provide as broad a spectrum of weed control.

5. Summary of major data gaps

Dates when major data gaps are due to be filled.

Data Requested	Due date (after publication of the Standard)
Statement of Composition	six months 1/
Discussion of formation of unintentional ingredients	six months 1/
Preliminary analysis of samples	six months 1/
Certification of limits	six months 1,2/
Analytical methods and data for enforcement of limits	six months 1,2/
Density, Bulk Density, or specific Gravity	six months 1/
Dissociation Constant	six months 1/
Octanol/water partition coefficient	six months 1/
pH	six months 1,2/
Oxidizing/Reducing Action	six months 1,2/
Flammability	six months 1,2/
Explodability	six months 1,2/
Storage Stability	six months 1,2/
Livestock residues	six months
Plant residues	six months
Animal residues	six months
Storage stability data	six months
Magnitude of the residue for each food use	six months
Hydrolysis	six months
Photodegradation (water, soil)	six months
Metabolism studies in lab	six months
Mobility studies - leaching and absorption/desorption	six months
Dissipation studies in field	six months
Monitoring of surface and groundwater	18 months
Primary eye irritation	six months 2,3,4/
Primary dermal sensitization	six months 4/
90-day feeding (rodent, non-rodent)	four years
Oncogenicity	four years
Teratogenicity	one year
Reproduction (2-generation)	20 months
Chromosomal aberration	20 months

Data Requested	Data Due (After publication of the Standard)
Other genotoxic effects	20 months
Avian dietary toxicity	six months
Acute toxicity to freshwater invertebrates	six months

1/ Data are required on the technical material

2/ Data are required on the 94% technical, which is used as a manufacturing use product, and the 28.2% flowable intermediate

3/ Data are required on all wettable powder formulations

4/ Data are required on all liquid formulations

6. Contact person at EPA: Robert Taylor, U.S. Environmental Protection Agency, TS-767-C, 401 M Street SW, Washington, DC 20460 (703) 557-1650

DISCLAIMER: The information presented in this Chemical Information Fact Sheet is for informational purposes only and may not be used to fulfill data requirements for pesticide registration and reregistration.